

**Institution: Newcastle University**

**Unit of Assessment: 17b Geography**

**Title of case study: Defining functional areas for policy development and implementation**

### 1. Summary of the impact

Coombes' research to advance spatial-analysis methodology has re-defined Travel-to-Work Areas (TTWAs) – the only official UK boundaries defined by academics – and produced three distinct strands of impact.

- **Use of Boundaries:** TTWA boundaries are widely used by the UK government and others because they accurately map economic geography; they are used to select areas for major funding support.
- **Use of Concept:** TTWAs are cited as 'bench-mark' functional economic area definitions in the guidance for implementing UK policies such as that on Local Economic Partnerships (LEPs).
- **Use of Methodology:** Countries in three continents have adapted the TTWA method to define functional areas for their official statistics.

### 2. Underpinning research

#### The need for appropriately-defined areas for policy development and implementation

Many policy decisions rely on comparing statistics on areas, and so using appropriately-defined areas makes for better policy decisions. An area can miss out on large sums of public funds if the boundary around that area is not drawn appropriately. Prior to the definition of TTWAs, all the local official statistics in the UK were reported for administrative areas, but administrative areas have idiosyncratic boundaries and this distorts the comparison of areas. (This sensitivity of statistical analyses to the areas used is the Modifiable Areal Unit Problem.)

#### CURDS research activity

Research in the Centre for Urban and Regional Development Studies (CURDS) on functional area definitions (e.g. TTWAs) had to overcome three different challenges:

- re-interpreting the local labour market area concept – previously assumed to be urban-centred – because modern commuting behaviour became very varied as jobs moved to different areas; the more flexible concept that was devised is of labour markets as commuting flow clusters, whose spatial form is not pre-determined;
- creating computer algorithms to implement this concept in analysing data on patterns of flows, so hugely increased computing power could utilise the greatly increased detail in available data (e.g. commuting matrices potentially having 1.7 billion cells);
- being sensitive to the constraints on innovation in official statistics by adopting a co-production of knowledge approach with policy colleagues.

#### Research mainly supporting impacts through Use of Boundaries

To make the TTWA definition methodology as self-optimising as possible required significant algorithmic and software innovation, while the multi-million cell commuting flow matrices initially had to be analysed with the computing power of the 1990s **(1)**. Census 2001 commuting datasets then provided unprecedented levels of spatial detail, supporting major refinements of the TTWA methodology to maximise its potential for self-optimisation **(2)**. This new refined version of the method was used to define 2001-based TTWAs as part of co-production of knowledge with ONS (Office for National Statistics) **(3)**.

#### Research mainly supporting the Use of Concept

Increasing the flexibility of the TTWA methodology extended its potential use beyond labour market area definitions, at a time when various new UK policies were aimed at functional economic areas. One radical use of the TTWA method applied it to innovative synthetic data (i.e. a dataset collating diverse patterns of local interactions), thus portraying each British locality as a 'space of flows' **(4)**. The increased flexibility of the latest version of the methodology further enhanced its transferability, as exemplified by its application to migration data analyses to define housing market areas **(5)**.

Research mainly supporting the **Use of Methodology**

Another form of transferability involves being usable in the very different geographical conditions, and with the different data available, in other countries with a recognised need for functional areas. TTWA definitions set new standards in regionalisation methods, prompting a review for the US Census Bureau to conclude that ‘British geographers have developed a more sophisticated computer algorithm for dividing the country into labour market areas’ (Frey & Speare, cited in (2)). Applying the method in Italy was a co-production of knowledge with its national statistical agency, and the resulting “customised” method is still used there. CURDS research for Eurostat has proved the methodology’s transferability to highly contrasting countries – for example, revealing the importance of cross-border flows for a country such as Belgium – while different challenges to the transferability of the method were explored with respect to countries with little available data (6).

Research all led by Mike Coombes (Professor of Geographic Information by 1998, in CURDS from 1977) working with Colin Wymer (Visiting Fellow, full-time academic-related staff until 2002).

**3. References to the research**

- 1) Office of National Statistics & Coombes M (1998) *1991-based Travel-to-Work Areas*, ONS, London [co-production of knowledge; CURDS developed and applied all the analyses]. Available from HEI on request.
- 2) Coombes M (2010) ‘Defining labour market areas by analysing commuting data: innovative methods in the 2007 review of Travel-to-Work Areas’ pp.227-241 in J Stillwell, O Duke-Williams and A Dennett (eds.) *Technologies for Migration and Population Analysis: Spatial Interaction Data Applications* IGI Global, Hershey, PA (USA) DOI: 10.4018/978-1-61520-755-8.
- 3) Coombes M and Bond S (2008) *Travel-to-Work Areas: The 2007 Review* ONS, London [co-production of knowledge; CURDS developed and applied all the analyses]. Available from HEI on request.
- 4) Coombes M (2000) ‘Defining locality boundaries with synthetic data’ *Environment & Planning A* 32:1499-1518 DOI 10.1068/929165.
- 5) Jones C, Coombes M, Dunse N, Watkins D and Wymer C (2012) ‘Tiered housing markets and their relationship to labour market areas’ *Urban Studies* 49:2633-2650 [consortium project; CURDS developed and applied all the analyses]. REF2 output: 180473.
- 6) Coombes M (2004) ‘Multiple dimensions of settlement systems: coping with complexity’ pp.307-324 in A Champion and G Hugo (eds.) *New Forms of Urbanization: Beyond the Urban-Rural Dichotomy* Ashgate, Aldershot ISBN-10: 0754635880. Available from HEI on request.

**Key research grants and consultancies:**

Investigator	Grant Title	Sponsor	Dates of Grant	Value to Newcastle
Coombes (PI)	Study on Comparable Labour Market Areas	Eurostat (sub-contract via DevStat)	Dec 2011- Oct 2012	£18,857
Coombes (PI)	The Geography of Housing Market Areas in England	National Housing & Planning Advisory Unit	2009-2010	£37,100
Coombes (PI)	Review of Travel to Work Areas	Office for National Statistics	Nov 2006- Dec 2007	£28,787
Coombes (Co-I)	The Economic Viability & Self-Containment of Geographical Economics: A Framework for Analysis	Office of the Deputy Prime Minister	Feb to Oct 2005	£31,850
Coombes (PI)	Provision of Intelligence Related to the Definition of Travel to Work Areas	Office for National Statistics	2004-2005	£9,847

## Impact case study (REF3b)

Coombes (PI)	Localities and City Regions Multi Source Definition for Census Research	ESRC	1994-1996	£35,724
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### 4. Details of the impact

**1. Use of Boundaries** *TTWA boundaries are widely used by the UK government and others because they accurately map economic geography: they are used to select areas for major funding support*

Numerous series of Official Statistics are reported by TTWAs, some on a monthly basis, and they are very widely used by labour market analysts and planners: for example the ONS's Nomis database supports several thousand TTWA-based downloads each year (**IMP1**). This usage level reflects the widespread recognition of TTWAs as the standard UK functional economic geography, officially endorsed by ONS following research studies when they “worked with Newcastle University to refine and then apply a complex allocation process which guarantees that all the TTWAs meet precise statistical criteria” (**IMP2**).

Government policy use of TTWAs includes guidance in the Treasury Green Book on how to assess the case for government intervention: TTWAs are cited in explaining how analyses should use areas that approximate local labour markets, and worked examples are given for one application, the assessment of proposed transport investments in Scotland (**IMP3**).

Major policies have for a decade now focused on cities, evidenced by the previous government's State of the English Cities research which relied on TTWAs. Recent significant developments include the £1.4bn Regional Growth Fund whose guidance on assessing bids cites TTWAs, whilst the announcement of City Deals based its choice of cities on TTWAs, even though the policy is explicitly aimed at local authorities whose boundaries are very different to TTWAs (**IMP4**).

These official uses of TTWAs are matched by third sector researchers utilising them to critique government policy. Examples include analyses by NESTA of creative clusters, and regional pay policy research finding TTWAs provide a “more precise way of looking at geographical differences” (**IMP5**). Parallel private sector TTWA usage includes their adoption as default definitions of labour market areas in modelling work, so that if TTWAs did not exist such work would be “done less well and less efficiently, to the detriment of both public policy-making and the public purse” (**IMP6**).

**2. Use of Concept** *TTWAs are cited as the ‘bench-mark’ functional economic area definitions, as in guidance for implementing UK policies such as that on Local Economic Partnerships (LEPs)*

The coalition government's new policy on ‘Local Growth’ implemented part of its predecessor's strategy by creating Local Enterprise Partnerships (LEPs) which straddle administrative boundaries to cover functional economic areas. The policy documents repeatedly reference TTWAs as the established template for assessing the functional reality of boundaries for proposed LEPs (**IMP7**).

An explicit link between economic development and housing policies led to a parallel need for housing market area (HMA) definitions which were also functional areas that potentially cut across administrative boundaries. Innovative research for the National Housing and Planning Advice Unit extended the TTWA definitions to identify consistently-defined HMAs, and despite the coalition government changing housing policy it stated that “[t]hese areas will help local planning” (**IMP8**). An academic paper on the implications of the research for planning professionals won the 2013 RTPI Education Award: Excellence in Spatial Planning.

**3. Use of Methodology** *Countries in three continents have adapted the TTWA method to define functional areas for their official statistics*

International organisations like OECD acknowledge that better spatial policy decisions are made when appropriate areas are used, and for economic development this means using functional

economic areas. A review for Eurostat has shown that many countries define labour market areas, but many rely on methods with severe limitations (e.g. when faced with vast sparse flow matrices – such as those on the c.30,000 French Communes – they would yield sub-optimal results because of limiting the possible solutions). Eurostat is convening a Task Force to consider taking forward the approach to multi-national LMA definitions developed in research in which “the contribution of Prof Coombes and his colleagues in Newcastle was substantively innovative and critical for the achievement of the quality of the study” (IMP9).

The transferability of the method to other countries means it can reveal the latent spatial structure within commuting datasets on countries with radically contrasting economic geographies and levels of urbanisation (e.g. Italy and New Zealand). The results have proved suitable for use with official statistics, and the increasingly available small area commuting data in 2010/2011 Censuses is seeing official TTWA-derived analyses in several countries including South Korea and Canada (IMP10).

### 5. Sources to corroborate the impact

- (IMP1) Statement from Nomis [this is direct evidence of the usage of statistics reported by TTWA]. Available on request.
- (IMP2) Statement from Office for National Statistics [this is evidence of the several co-production of knowledge projects by ONS and researchers at Newcastle, and of their value to ONS]. Available on request.
- (IMP3) Transport Scotland (2008) *Developing a Case by Case Approach* The Scottish Government, Edinburgh [www.transportscotland.gov.uk/stag/td/Part2/Economy/9.4.4.1](http://www.transportscotland.gov.uk/stag/td/Part2/Economy/9.4.4.1) [there is a worked example of the Treasury guidance using TTWAs in Tables 9.3 & 9.5].
- (IMP4) HM Government (2011) *Unlocking Growth in Cities* Cabinet Office, London [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/7523/CO\\_Unlocking\\_20GrowthCities\\_acc.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7523/CO_Unlocking_20GrowthCities_acc.pdf) [the quote is on page 3, showing public funding guided by TTWA]
- (IMP5) Incomes Data Services (2011) *Location-Based Pay Differentiation* Unison, London [www.docstoc.com/docs/158456102/IDS-research-paper-for-UNISON-FINAL-16-09-11-2](http://www.docstoc.com/docs/158456102/IDS-research-paper-for-UNISON-FINAL-16-09-11-2) [the quote is from page 26 and is evidence of the recognition of the robustness of TTWAs].
- (IMP6) Letter from Private Sector Consultancy [this letter evidences the use of TTWAs in the private sector, and its value to their clients, who are often policymakers in the public sector]. Available on request.
- (IMP7) HM Government (2010) *Local Enterprise Partnerships* Letter from Secretaries of State BIS & CLG to local authority and business leaders [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/5649/1626854.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/5649/1626854.pdf) [specific reference to travel to work areas is on page 2; White Papers and documentation laying the foundations for Local Enterprise Partnerships had cited TTWAs as a bench-mark].
- (IMP8) Department of Communities and Local Government (2010) *Geography of Housing Market Areas: Final Report and Summary* [www.gov.uk/government/publications/housing-market-areas](http://www.gov.uk/government/publications/housing-market-areas) [the whole document describes the development and application of a version of the TTWA method which applies its principles to the definition of Housing Market Areas].
- (IMP9) Statement from Eurostat [this is evidence of the key role of work in Newcastle as the basis for the potential development of harmonised LMA definitions covering the whole of the EU]. Available on request.
- (IMP10) Munro A, Alasia A, Bollman R (2011) *Self-Contained Labour Areas: A Proposed Delineation and Classification by Degree of Rurality* Statistics Canada, Ottawa [publications.gc.ca/collections/collection\\_2011/statcan/21-006-X/21-006-x2008008-eng.pdf](http://publications.gc.ca/collections/collection_2011/statcan/21-006-X/21-006-x2008008-eng.pdf) [the whole document describes the application of an adapted version of the TTWA method].